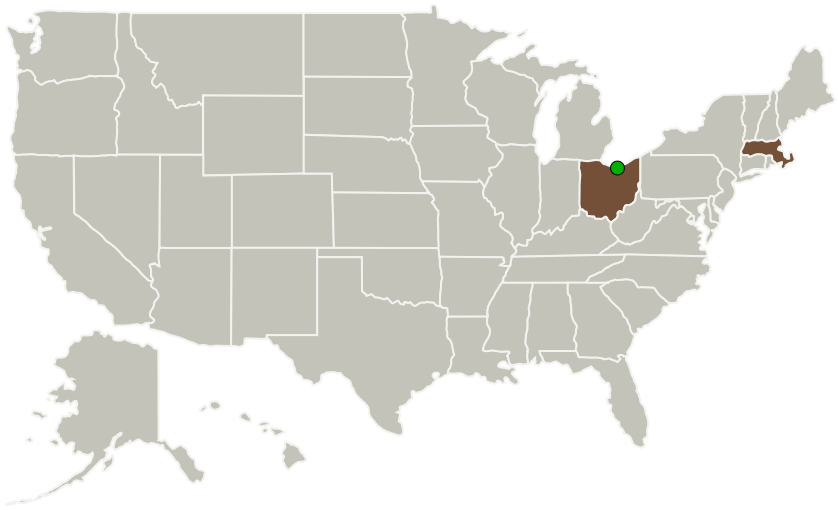
Dry Epitaxial Lift-Off for High Efficiency Solar Cells, Phase I

Completed Technology Project (2011 - 2011)

Project Introduction

A new method of transferring epitaxially grown active films onto an inexpensive polymeric flexible carrier. Specifically, for making thin lightweight high efficiency (> 30%) IMM3J solar cells while reusing the GaAs or Ge base wafer. This will reduce the costs of fabricating high efficiency PV cells by 30% and will raise specific power to > 200W/kg. The method uses a thin strained layer under the epitaxially grown active layers without ion implantation or wet etching. A crack propagates in the strained layer splitting the epi-layers from the base wafer after bonding to polyimide wafer, hence dry epitaxial lift-off (DELO), due to the difference in thermal expansion coefficients between the semiconductor and flexible substrate without applying mechanical pressure. The base wafer is re-used to grow new epi-layers.

Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
OptiCOMP Networks	Lead Organization	Industry	Attleboro, Massachusetts
Glenn Research Center(GRC)	Supporting Organization	NASA Center	Cleveland, Ohio

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Primary U.S. Work Locations	
Massachusetts	Ohio

Project Transitions

February 2011: Project Start

September 2011: Closed out

Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/138104)*

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

OptiCOMP Networks

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

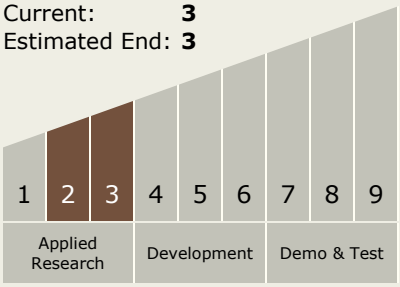
Carlos Torrez

Principal Investigator:

John Farah

Technology Maturity (TRL)

Start: **2**
Current: **3**
Estimated End: **3**



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Technology Areas

Primary:

- TX03 Aerospace Power and Energy Storage
  - TX03.1 Power Generation and Energy Conversion
    - TX03.1.1 Photovoltaic

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System